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GB	1559645	GB	1280905
GB	1537569	GB	1234783

(58) Field of search
F2G

(71) Applicant
McAlpine & Company Limited (United Kingdom), Kelvin Avenue, Hillington, Glasgow G52 4LF

(72) Inventor
James Edward McAlpine

(74) Agent and/or Address for Service
Marks & Clerk, 19 Royal Exchange Square, Glasgow G1 3AE

(54) Toilet pan connectors

(57) A toilet pan connector for sealingly connecting between a toilet pan outlet and a soil pipe system, in which the connector is provided with means (23) eg a concave tubular collar or bellows intermedial the ends (10, 11) thereof which allows flexibility of the connector without distortion of seals (12, 19 and 21) at either end of the connector. The socket seal has a rubber sealing flange 14 with the synthetic plastic sealing flange 19 acting as a back-up seal.

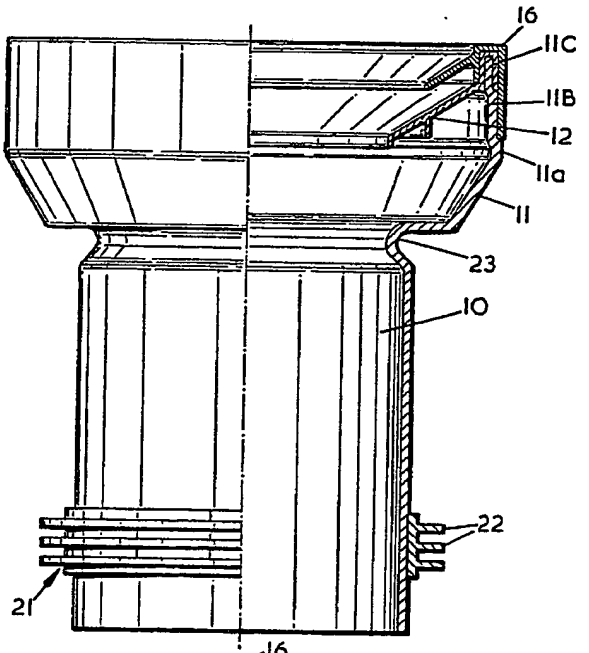

FIG. 1

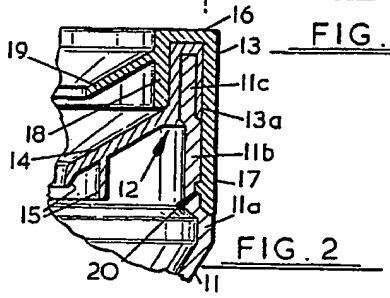

FIG. 2

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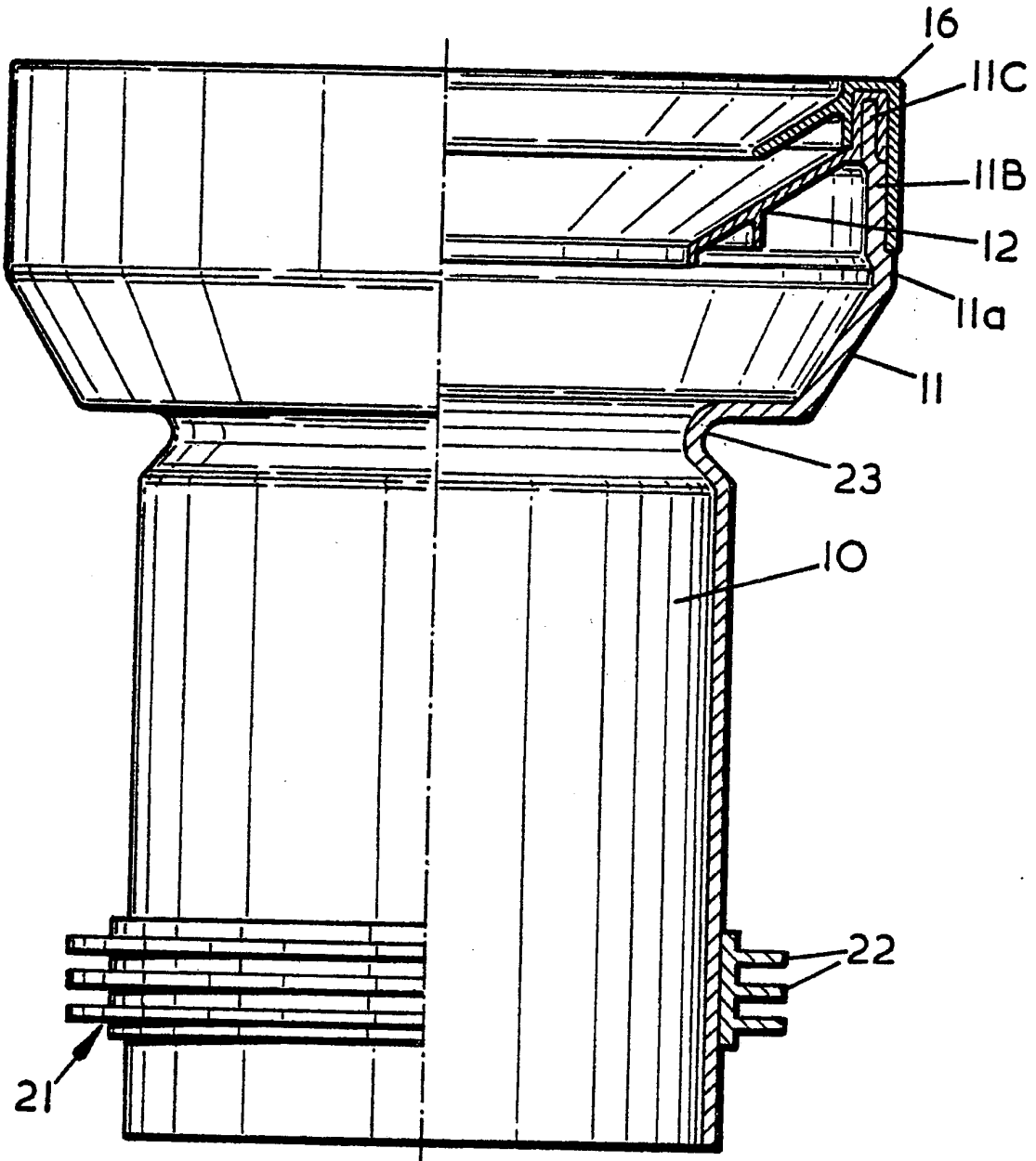

FIG. 1

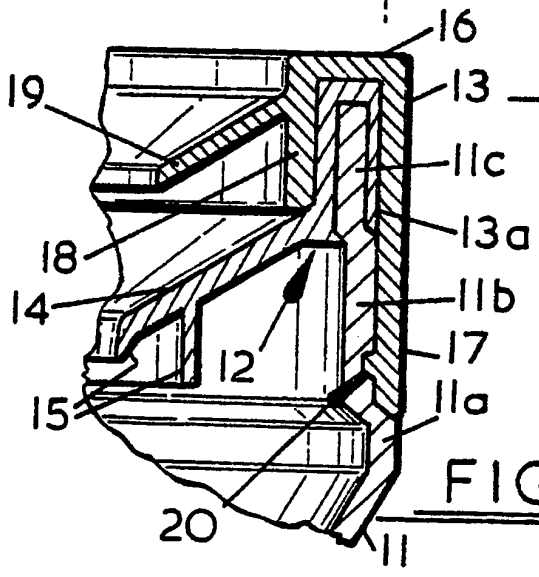

FIG. 2

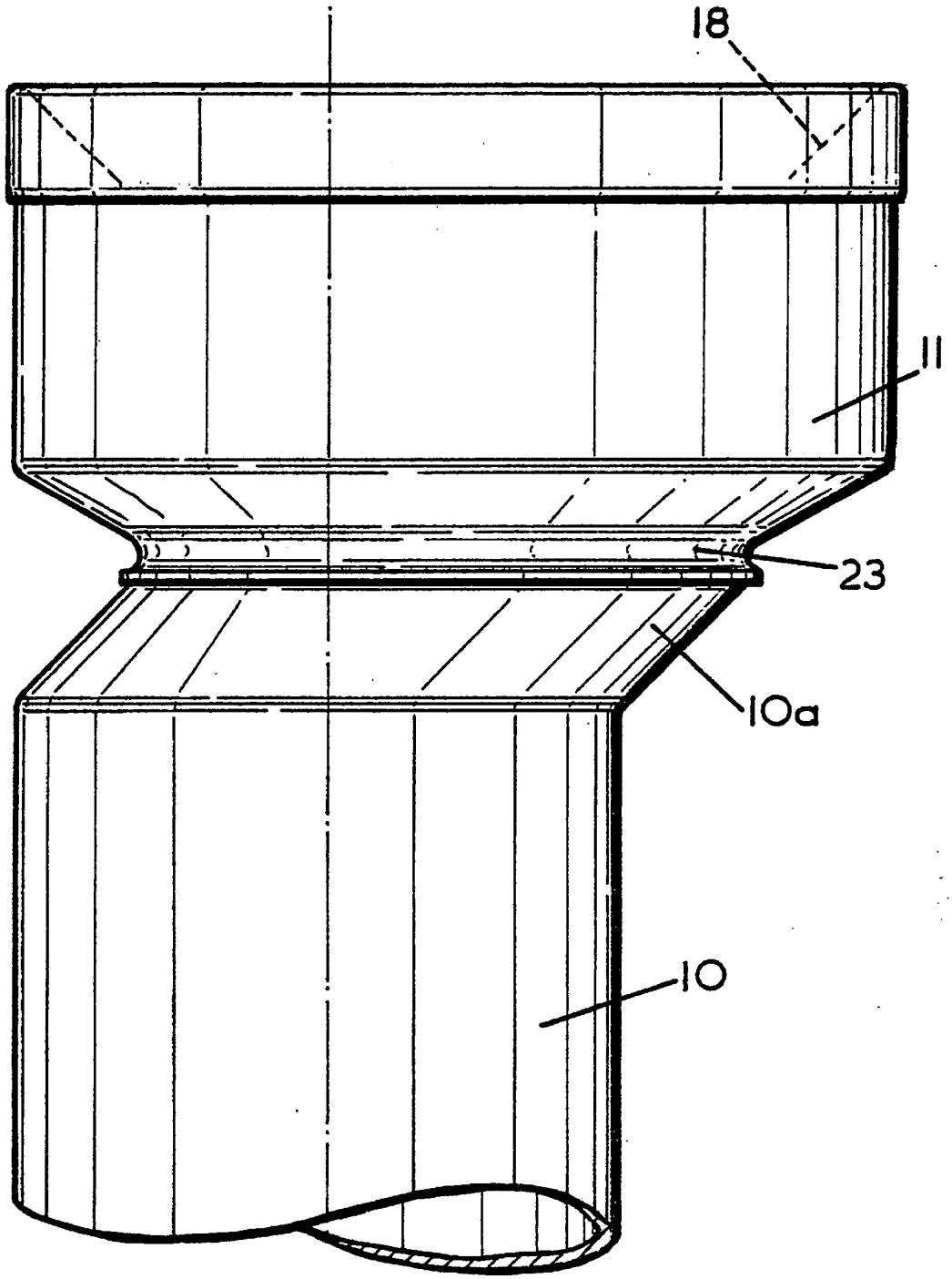

FIG. 3

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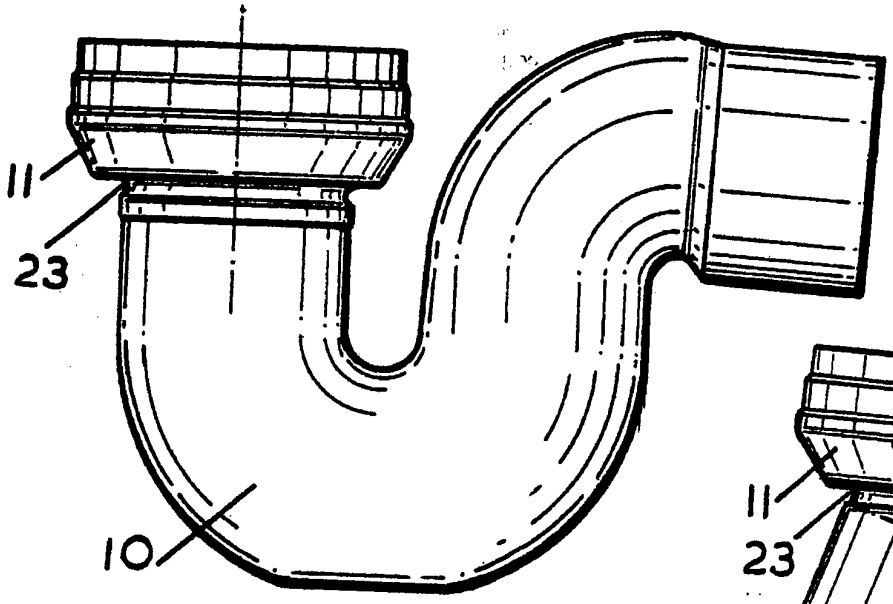

FIG. 4

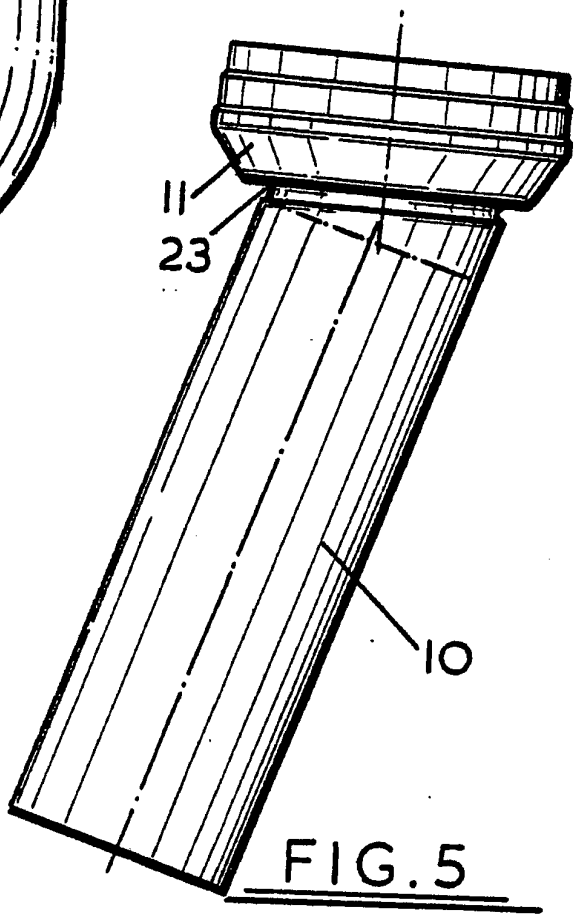

FIG. 5

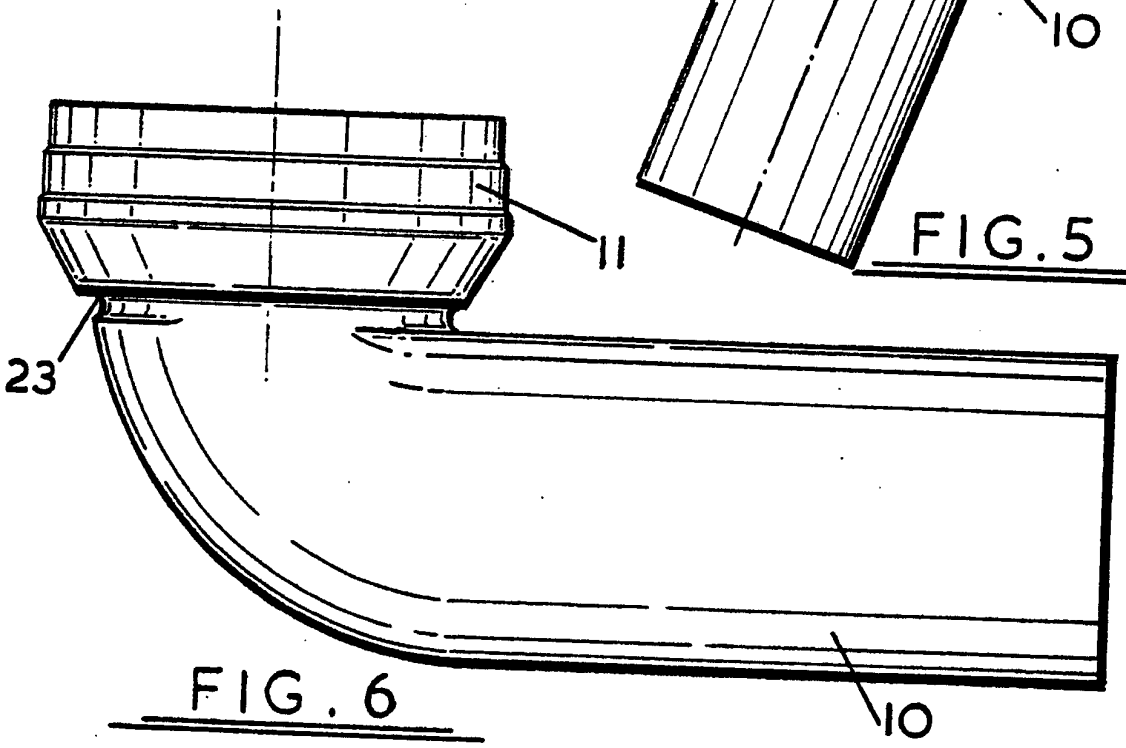

FIG. 6

SPECIFICATION

Improvements in or relating to toilet pan connectors and sealing means therefor

This invention relates to toilet pan connectors for connecting the outlet of a toilet pan to a soil pipe and to sealing means for such a connector. Such toilet pan connectors have previously been proposed wherein each connector includes an enlarged socket of synthetic plastics material adapted to receive the toilet pan outlet in a sealed manner. The socket is integrally moulded to one end of a pipe length of the same material as the socket and said pipe length can be connected to the soil pipe.

It is common practice to provide a rubber sealing fin internally of the socket so that when the toilet bowl outlet is inserted into the socket, the fin seals against the external surface of the toilet bowl outlet. It is also common practice to provide the free end of the connector remote from the socket with an external rubber sealing sleeve whereby the free end of the pipe length of the connector can be inserted into a soil pipe system. The external radial ribs of the sleeve act to seal between the connector and the soil pipe.

Because of inaccuracies in the relative positions of the toilet pan and the soil pipe system it is frequently necessary to try to adjust the position of the connector which interconnects them. Such adjustments tend to distort the seals either within the socket or on the exterior of the pipe end of the connector.

An object of the present invention is to provide a toilet pan connector having means for facilitating limited adjustment arising from positional inaccuracies in the toilet pan or the like which it interconnects.

According to the present invention there is provided a toilet pan connector for sealingly connecting between a toilet pan outlet and a soil pipe system, said connector comprising a pipe having a toilet pan outlet-receiving tubular socket at least at one end thereof and means interconnecting the socket and the pipe whereby the socket can be positionally adjusted relative to the pipe.

Preferably, the pipe and the socket are of synthetic plastics material and are integral with each other, the means connecting the pipe and the socket being an integrally moulded tubular collar of concave cross-section.

Embodiments of the present invention will now be described by way of example, with reference to the accompanying drawings in which:—

Fig. 1 illustrates a toilet pan connector according to the invention comprising a socket and an integral pipe of which the longitudinal axis is coincident with the axis of the socket;

Fig. 2 is a detail view of a socket seal incorporated in Fig. 1;

Fig. 3 shows a toilet pan collector in which the axis of the socket is offset but parallel to the axis of the pipe;

Figs. 4, 5 and 6 illustrate alternative configurations of the toilet pan connector.

Referring to the drawings, a toilet pan connector moulded from synthetic plastics material, e.g. polypropylene, comprises a pipe 10 provided with an integral enlarged socket 11 for reception of the free end of the outlet pipe of a toilet pan.

As can be seen best in Fig. 2, the wall of the socket is of stepped configuration as at 11*a*, 11*b* and 11*c*. The steps 11*a*, 11*b* and 11*c* are of reducing diameter towards the outer end of the socket 11. Surrounding the step 11*c* is an annular elastomeric seal 12 e.g. of rubber. The elastomeric seal 12 has a retaining portion 13 which seats over the step 11*c* of the socket wall and has an inwardly and downwardly directed primary sealing fin or flange 14 integral with the retaining portion 13. The flange 14 has a pair of downwardly extending integral ribs 15 formed thereon for engagement with the side wall of the socket when the flange is deformed by the outlet pipe of a toilet pan being inserted thereinto. It will be noted from Fig. 2 that an outer limb 13*a* of the retaining portion 13 nests in the recess formed by the steps 11*c* and 11*b*. In this way, the outer surface of the limb 13*a* is flush with the outer surface of the step 11*b*. Mounted over the retaining portion 13 of the sealing ring 12 is an annular cap 16 of synthetic plastics material e.g. polypropylene having a body which seats over the retaining portion 13 of the rubber seal 12. The body of the cap 16 has a longer limb 17 which extends downwardly in the form of a skirt over the outer surface of the retaining portion 13 of the seal 12 and its associated socket wall 11. A shorter limb 18 extends downwardly over radially inner surface of the retaining portion 13 of the seal 12 and the shorter limb 18 has an integral secondary sealing fin or flange 19 which extends inwardly and downwardly parallel to the flange 14 of the seal 12.

The internal surface of the longer limb 17 of the cap 16 is provided with an integral projecting bead 20 which co-operates with an annular recess on the outer surface of the step 11*b* of the socket wall. In this way the cap 16 is a snap fit over the elastomeric seal 12 and associated socket 11. Towards the free end of the pipe 10, a radial fin seal 21 of rubber or other material is slidably disposed around the exterior of the pipe. The fins 22 of the seal 21 are adapted to engage the internal wall of a soil pipe system thereby connecting the soil pipe system to the toilet pan.

The socket 11 is interconnected to the pipe 10 through the intermediary of a tubular collar 23. The tubular collar 23 is integrally moulded along with the socket 11 and the pipe 10 and as shown in Fig. 1 is of concave configuration. An interconnecting collar of this form allows limited flexibility between the socket 11 and the pipe 10.

In use of the toilet pan connector of the invention, an outlet pipe of a toilet pan is to be connected to a soil pipe system. If the toilet pan connector was of a rigid structure, then any attempt to compensate for any slight

misalignment between the toilet pan outlet pipe and the soil pipe system would result in a distortion of the connector which would distort the seal between the connector and the toilet pan outlet pipe and between the connector and the soil pipe system. With a toilet pan connector of the present invention wherein limited positional adjustment is possible between the socket 11 and the pipe 10, any misalignment can be accommodated by means of the flexible collar 23 without distortion of either of the seals.

It will be appreciated that although the flexible means interconnecting the socket 11 and the pipe 10 in the above described embodiment is shown to be a concave tubular collar 23, other flexible configurations can be employed so long as limited flexible adjustment between the socket 11 and the pipe 10 is permitted. For example, the collar 23 could be of convex form or constructed in the form of a bellows.

The particular form of socket seal shown in Figs. 1 and 2 allows the free end of the tubular outlet pipe of a toilet pan to be pushed into the socket 11 until it abuts against a lower portion of the socket. In doing so, both the rubber sealing flange 14 and the synthetic plastics sealing flange 19 are deformed so that they seal between the outer surface of the inserted pipe section and the internal wall of the socket and between the outer surface of the inserted pipe section and the upper surface of the rubber flange 14 respectively. If the toilet pan connector is being used in an environment where the rubber seal is prone to break up over a period of time, then the synthetic plastics flange 19 acts as a back-up to the seal flange 14 as it is more resistant to deterioration in conditions in which a rubber seal is adversely affected.

Although the flanges 14 and 19 are referred to above as being of rubber and a synthetic plastics material respectively, it will be appreciated that they can be of other materials having dissimilar properties depending upon the environment in which they have to be employed.

Figs. 3, 4, 5 and 6 illustrate alternative configurations of toilet pan connectors in accordance with the present invention, each incorporating a concave flexible collar 23 which permits limited flexing between the socket 11 and its associated pipe 10. In Fig. 3, the socket 11 is connected to an offset portion 10*a* of the pipe 10 by means of the tubular integral collar 23. Fig. 4 illustrates a toilet pan connector in which the pipe 10 is connected to the socket 11 through a flexible tubular collar 23 and the pipe is in the form of a U-bend. Fig. 5 shows a toilet pan connector in which a straight pipe 10 is angled relative to the axis of the socket 11. Again, a tubular collar 23 interconnects the pipe 10 and the socket 11. Fig. 6 illustrates a toilet pan connector in which the socket 11 is interconnected to the pipe 10 through a flexible collar 23 and the axis of the pipe is disposed at 90° relative to the axis of the socket 11.

CLAIMS

1. A toilet pan connector for sealingly connecting between a toilet pan outlet and a soil pipe system, said connector comprising a pipe having a toilet pan outlet-receiving tubular socket at least at one end thereof and means interconnecting the socket and the pipe whereby the socket can be positionally adjusted relative to the pipe.

2. A connector as claimed in claim 1, in which the pipe and socket are integral with each other, the means connecting the pipe and socket being an integrally moulded flexible tubular collar.

3. A connector as claimed in claim 2, in which the tubular collar is flexible by means of a convex or concave construction in cross-section.

4. A connector as claimed in claim 2, in which the tubular collar is flexible by means of a bellows construction.

5. A connector as claimed in any of claims 2 to 4, in which the connector is integrally moulded of a synthetic plastics material.

6. A connector as claimed in claim 5, in which the synthetic plastics material is polypropylene.

7. A connector as claimed in any preceding claim, in which the longitudinal axes of the socket and the pipe are coincident.

8. A connector as claimed in any of claims 1 to 6, in which the axis of the socket is offset and parallel to the axis of the pipe.

9. A connector as claimed in any of claims 1 to 6, in which the axis of the pipe is disposed at an angle relative to the axis of the socket.

10. A connector as claimed in claim 9, in which the angle is 90°.

11. A connector as claimed in any preceding claim, in which the free end of the tubular socket is provided with sealing means for sealingly receiving the toilet pan outlet, said sealing means comprising a first sealing element adapted to be mounted adjacent the free end of the socket and having at least one internally directed flange projecting into the bore of the socket whereby said flange will seal between the outer surface of the toilet pan outlet and the internal surface of the connector on insertion of the toilet pan outlet into the socket, and a second sealing element superimposed on said first sealing element and adapted to act as a back-up seal to said first sealing element and having at least one internally directed flange adapted to seal between the outer surface of an inserted toilet pan outlet and a surface of the flange of the first sealing element.

12. A connector as claimed in claim 11, in which at least the flange of the first sealing element is provided with one or more integral ribs for engagement with the internal side wall of the socket.

13. A connector as claimed in claim 11 or 12, in which the first and second sealing elements are formed of differing materials.

14. A connector as claimed in claim 13, in which the first sealing element is of rubber and the second sealing element is of a synthetic plastics

material.

15. A connector as claimed in any preceding claim, in which an external annular seal is provided adjacent that end of the connector pipe remote from the socket, said external seal having one or more outwardly projecting fins adapted to engage the internal wall of a pipe system to which the toilet pan is to be connected by the connector.

16. A connector as claimed in claim 15, in which said fin or fins is or are of rubber.

17. Sealing means for a toilet pan connector as claimed in any preceding claim, said sealing means comprising a first annular sealing element adapted to be mounted adjacent the free end of the socket of the connector and having at least one radially inwardly directed flange, and a second back-up annular sealing element superimposed on said first sealing element and having at least one radially inwardly-directed flange adapted, when in use to seal against a surface of the flange of the first sealing element.

18. Sealing means as claimed in claim 17, in which at least the flange of the first sealing element is provided with one or more downwardly directed integral ribs angled relative to said flange.

19. Sealing means as claimed in claim 17 or 18, in which the first and second sealing elements are formed of differing materials.

20. Sealing means as claimed in claim 19, in which the first sealing element is of rubber and the second sealing element is of a synthetic plastics material.

21. A toilet pan connector substantially as hereinbefore described with reference to Figs. 1 and 2, Fig. 3, Fig. 4, Fig. 5 or Fig. 6 of the accompanying drawings.

22. Sealing means for a toilet pan connector, said sealing means being substantially as hereinbefore described with reference to Figs. 1 and 2 of the accompanying drawings.

Superseded claim 1.

1. A toilet pan connector for sealingly connecting between a toilet pan outlet and a soil pipe system, said connector comprising a pipe having a toilet pan outlet-receiving tubular socket at least at one end thereof and means interconnecting the socket and the pipe whereby the socket can be positionally adjusted relative to the pipe, wherein the pipe and socket are integral with each other and the means connecting the pipe and socket comprises an integrally moulded flexible tubular collar having a single convex or concave construction in cross-section.

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